



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/017,358	12/13/2001	Jeffrey D. Walker	21153-05929	6851
758	7590	03/11/2005	EXAMINER	
FENWICK & WEST LLP SILICON VALLEY CENTER 801 CALIFORNIA STREET MOUNTAIN VIEW, CA 94041			PAYNE, DAVID C	
			ART UNIT	PAPER NUMBER
			2633	

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/017,358

Applicant(s)

WALKER, JEFFREY D.

Examiner

David C. Payne

Art Unit

2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 15-31, 34-36, and 38-45 is/are rejected.
- 7) ☐ Claim(s) 13, 14, 32, 33 and 37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 12/9/04, 7/9/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because hand-drawn and illegible. Applicant is advised to employ the services of a competent patent draftsman outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claim 29 is rejected under 35 U.S.C. 102(b) as being anticipated by Dijaili et al. US 6,347,106 B1 (Dijaili).

Re claim 29 Dijaili disclosed

An optical modulator comprising: an external modulator; and a vertical lasing semiconductor optical amplifier (VLSOA) coupled to the external modulator, the VLSOA comprising: a semiconductor active region; an amplifying path traversing the semiconductor active region; and a laser cavity including the semiconductor active region, wherein the laser cavity is oriented vertically with respect to the amplifying path

Art Unit: 2633

and pumping the laser cavity above a lasing threshold clamps a gain along the amplifying path to a substantially constant value (see Dijaili e.g., col./line: 3/1-67, 4/10, 3/60-65).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6, 5, 15, 21, 22, 24, 25, 27, 28, 34, 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inomoto US 5,811,838 (Inomoto) in view of Dijaili et al. US 6,347,106 B1 (Dijaili).

Re claims 1, 2, 5, 22, 24, 28 and 34, Inomoto disclosed

An optical transmitter comprising: a modulated source for generating a modulated optical signal (e.g., col./lines: 2/20-25, 2/50-55, 5/40-45);

Inomoto does not disclose a vertical lasing semiconductor optical amplifier (VLSOA).

Dijaili disclosed a VLSOA for amplifying a modulated optical signal, the VLSOA comprising a semiconductor active region; an amplifying path traversing the semiconductor active region; and a laser cavity including the semiconductor active region, wherein the laser cavity is oriented vertically with respect to the amplifying path

Art Unit: 2633

and pumping the laser cavity above a lasing threshold clamps a gain along the amplifying path to a substantially constant value (see Dijaili e.g., col./line: 3/1-67, 4/10, 3/60-65). It would have been obvious to one of ordinary skill in the art at the time of invention to use the Dijaili amplifier in the Inomoto invention to increase the gain of the optical signal since amplifiers are well known for increasing the gain of optical signals.

Re claims 3 and 4, while the modified invention does not disclose the connection between every element, it would have been obvious to one of ordinary skill in the art at the time of invention that one could connect a transmitter to an amplifier with any type of waveguide or free space as these are notoriously well known in the art for coupling optical elements.

Re claim 42 (and 27) Inomoto disclosed,

A high power, high speed optical transmitter comprising:

a laser source for generating an optical carrier; a modulator coupled to the laser source for modulating data onto the optical carrier at a data rate of at least 1 Gbps and that the device could output up to 8 mw (e.g., col./lines: 2/20-25, 2/50-55, 5/40-45). Inomoto does not disclose a linear, semiconductor optical amplifier coupled to the modulator capable of amplifying the modulated optical carrier to a power of at least 1 mW.

Dijaili disclosed a vertical semiconductor optical amplifier. It would have been obvious to one of ordinary skill in the art at the time of invention to use the Dijaili amplifier in the Inomoto invention to increase the gain of the optical signal since amplifiers are well known for increasing the gain of optical signals.

Re claim 43, the modified invention of Inomoto and Dijaili disclosed a semiconductor

Art Unit: 2633

optical amplifier comprises a VLSEA, see Dijaili Figure 1, e.g., col./lines: 3/45-65, 3/1-20).

Re claims 6, 44, the modified invention of Inomoto and Dijaili disclosed wherein the laser source and the modulator together include an electro-absorption-modulated laser (EML), see e.g., Inomoto col./lines: 2/50-55.

Re claim 15, the modified invention of Inomoto and Dijaili disclosed wherein the laser source, the modulator and the VLSEA are integrated on an InP substrate, see Dijaili col./lines: 1/50-55.

Re claim 21, the modified invention does not teach a plurality of devices. However, it is not patentable over the prior art to scale a system. It is obvious to one of ordinary skill in the art at the time of invention to add more devices such as light sources or amplifiers for greater communication capacity.

Re claim 25, the modified invention of Inomoto and Dijaili disclosed wherein the modulated optical signal lies in a wavelength region located between 1.3 micron and 1.7 micron, see Dijaili col./line: 2/10-15.

6. Claims 30, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dijaili et al. US 6,347,106 B1 (Dijaili) in further view of Matsumoto US 6,516,017 B1 (Matsumoto).

Re claim 30,

Art Unit: 2633

Dijaili as discussed does not disclose wherein the modulator and the semiconductor optical amplifier are integrated on a common substrate. Matsumoto disclosed the integration of a laser, electro-absorption modulator, and amplifier on a common substrate, see e.g. col./line: 13/20-25, 15/45-50. It would have been obvious to one of ordinary skill in the art at the time of invention to integrate all the aforementioned elements on a common substrate so that each element would undergo the same change in properties by having the same thermal expansion coefficient.

Re claim 31, wherein the external modulator includes an electro-absorption modulator, see e.g., Matsumoto col./line: 5/5-10.

7. Claims 7, 8, 9, 10, 11, 16, 17, 18, 19, 20, 23, 35, 36, 38, 39, 40, 41, 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inomoto US 5,811,838 (Inomoto) and Dijaili et al. US 6,347,106 B1 (Dijaili) as applied to claims 22, 34 and 42 above, and in further view of Matsumoto US 6,516,017 B1 (Matsumoto).

Re claims 9, 11, 16, 17, 18, 23, 35, 38, 45,

The modified invention of Inomoto and Dijaili as discussed does not disclose wherein the laser source, the modulator and the semiconductor optical amplifier are integrated on a common substrate. Matsumoto disclosed the integration of a laser, electro-absorption modulator, and amplifier on a common substrate, see e.g. col./line: 13/20-25, 15/45-50. It would have been obvious to one of ordinary skill in the art at the time of invention to integrate all the aforementioned elements on a common substrate so that each element would undergo the same change in properties by having the same thermal expansion coefficient.

Art Unit: 2633

Re claim(s) 10, 36, wherein the laser source is selected from a group consisting of a DBR laser and a DFB laser, see Matsumoto e.g. col./line: 8/40-45.

Re claim(s) 7, 8, 26, 40, 41, wherein the laser source includes a tunable multi-wavelength laser source, see Matsumoto e.g. col./line: 8/40-55.

Re claim 39, the modified invention of Inomoto and Dijaili disclosed wherein common substrate is an InP substrate, see Dijaili col./lines: 1/50-55.

Re claim 19, the modified invention does not teach wherein the optical coupler is a wavelength division multiplexer. However, it would have been obvious to one of ordinary skill in the art at the time of invention to use a WDM multiplexer as a coupler since these are efficient devices for adding wavelengths to a line and are well known in the art.

Re claim 20, the modified invention does not teach a plurality of devices. However, it is not patentable over the prior art to scale a system. It is obvious to one of ordinary skill in the art at the time of invention to add more devices such as light sources or amplifiers for greater communication capacity.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Inomoto US 5,811,838 (Inomoto) and Dijaili et al. US 6,347,106 B1 (Dijaili) as applied to claim 1 above, and in further view of Feuer et al. US 5657148 A (Feuer).

The modified invention of Inomoto and Dijaili as discussed does not disclose wherein the modulator includes a lithium niobate modulator. Feuer disclosed the use of a lithium niobate modulator, see col./line: 5/10-20. It would have been obvious to one of ordinary

Art Unit: 2633

skill in the art at the time of invention to use such a modulator in the modified invention due to their compatibility with optical fiber, high frequency bandwidth (up to 40 GHz), low driving voltage, and rugged and all solid state construction and they allow multiple optical components can be integrated into a single chip

Allowable Subject Matter

9. Claims 13, 14, 32, 33, and 37 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David C. Payne whose telephone number is (571) 272-3024. The examiner can normally be reached on M-F, 7a-4p.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (571) 272-3022. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2633

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Dcp



David C. Payne
Patent Examiner
AU 2633